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THE JOURNAL OF PHILOSOPHY

MATTER AND SCIENTIFIC EFFICIENCY. II [43]

SCIENCE AND MATTER: THOMAS, DESCARTES, AND WHITEHEAD

THE Thomistic metaphysical analysis ends in a conception of matter foreshadowing the adaptation of the term for the uses of scientific inquiry. Prime matter, the restricted prime matter relevant to this world, is responsive in a broadly determinate way to the diversity of forms comprising a world-set. It is indeterminate, and yet determinate within its indeterminacy. Grant that *corporeitas*, grant that indeterminate dimensionality in matter prior to the reception of the substantial form, are midway conceptions in the thought of St. Thomas, while *materia quantitate signata* represents the terminus of his thought: it must be conceded that Thomas assigns to prime matter a contributive character. In the reciprocal causality of matter and form, to adopt Forest's phrase, matter makes a contribution, out of its own resources, as it were, to the being of a concrete existent. Reduce the rôle of prime matter to the minimum, if you will, but it responds to the evocative lure of forms by receiving within itself only those forms that can be accommodated to such a prime matter because only such a prime matter can accommodate itself to such forms. Undeniably, Thomas is forcefully maintaining the concreteness and reality of the things to which children and Aristotle point.[44]

The analysis, provided that preceding contentions are sustainable, represents the first stage in the formation of a program adjusted to the needs of scientific inquiry procedurally independent of metaphysics and theology. More accurately, perhaps, it is the first step toward a new and efficient (or differently efficient?) scientific program. The objectives and conditions for the pursuit of inquiry are anticipatorily sketched by the metaphysical analysis. There is a realm of things—theology knows these to be creatures—and the realm has a unity of order so that these many things do indeed constitute a realm. Sciences propose to know these things

[43] Continued from preceding issue, Vol. XLI (1944) pp. 645–664.

[44] The deity, having created creatures, vouchsafes to them careers of their own and in accord with their respective natures. Cf. *F*, p. 297.

and this order. In the metaphysical analysis, the many existents are due to the reciprocal causality of matter-and-form. Since the world—it is Creation—has a unity of order, and yet existence is concrete, order pervades existence. The existents and this order can not be dissevered. In some measure, human cognitive powers are fitted to know this world, within which indeed these cognitive powers are comprised, both as to its unity of order and as to its discrete existents. Speculations concerning other world-sets of forms reducing appropriate prime matters to actualities are of no concern for science. For science is concerned, not with what is possible for Omnipotence, but with what is, and is possible, in this world which is understood, upon the assurances of theology, to have been created. Metaphysically, the contents of this world are what they are in virtue of a reciprocal causality between a world-set of forms and a prime matter responsive to them in accord with its own indwelling proclivity. It is of course emphatically necessary to understand that "world-set" and "prime matter," "matter" and "form," represent metaphysical distinctions of idea and of discourse, not corresponding entitative actualities. As children fully realize, this world before us is a realm of things, of creatures,—of dogs and stones and butterflies and spinach and apples, and great are the differences between them. These things, enjoying a career to which their several natures entitle them under an order which theologians know to be creation, are not matter and form, but rather instances of this-matter-and-this-form. There are a very great many of these combinations of this-matter-and-this-form, and perhaps science can not find out very much about any of them. Even physicists at times leave their laboratories in order that they may enjoy the flowers in their gardens. Again, this order that theologians would call the order of Creation is a matter of considerable complexity. It is, however, the task of scientific inquiry to find out something about it. Neither existents nor order can be neglected without insuring the defeat of science; or, at least, without failing to obtain that science which Descartes desired, not only in order to satisfy his passion for certainty, but also in order to enable the race of men to walk with security in this life.

In these conditions, a program of efficiency is desperately needed. But the devising of such a program means a reckoning with matter and form. Under whatever masquerade of words the task of science is portrayed, it can not escape the import of the distinction between matter and form. It is not the words that count, it is rather the necessities of the case. The proposal of science is to secure knowledge of things and of the cosmic order

which insures that the field of inquiry is in some sense and in some degree a whole. Grant that scientific understanding of these things and this whole differs not only from theology's understanding of them, but also from that which metaphysics seeks to achieve. Nevertheless, the metaphysical analysis of existence, unless through and through illusory, must have significance for science. The distinction between matter and form may be variously interpreted as to the content to be assigned to "matter" and to "form." The tension between reflection and experience makes the distinction inescapable, for scientific inquiry no less than for metaphysics. The terminology of science conserves traces of the metaphysical distinction despite discontinuities and novelties in the symbols employed. It is historically significant, although perhaps deplorable, that "matter" was carried over into the terminology of science. It is a pity that Descartes did not unambiguously reserve the term for metaphysics, devising new terms for the scientific correlates of "matter," as indeed he sought to do for the scientific correlates of "form." However that may be, the scientific use of "matter" suggests that the word carried a load of metaphysical meaning peculiarly pertinent to the task of inquiry. Perhaps the load served to mark out the limits of this task while signalizing its relative independence of metaphysics and theology. Efficiency in the program for inquiry, one gathers from Whitehead, goes along with abstraction. Science must reckon with all the things there are, and there are a great many. It may recognize that each of these things is a this-matter-and-this-form. It must acknowledge that a science of the singular in its imprescriptible singularity is not a science achievable by man. Efficiency demands abstraction, yet that abstraction must be pertinent to the many things that exist, to something that all possess under the over-arching unity of order. If "matter," in consequence of the definition it receives by metaphysical analysis, serve to point towards efficient abstraction, then so much the better.

It may now be profitable to return to St. Thomas. A realm of things lies before us. Obviously, it does not consist of prime matter, on the one hand, and of forms, on the other. Prime matter, even a restricted prime matter, can not exist. It can not even be known, save in a certain sense. Moreover, forms do not exist. Things exist. If knowable, and presumably they are, the distinction between matter and form, in so far as truly characterizing what it means to be, to be a finite existent, to be a thing, is fundamental to the total conditions of their knowability. Each term indicates something for which scientific inquiry, in a manner appropriate to its procedural program, must find a content. The

diversity of things is analytically resoluble into a diversity of forms in view of which a diversifiability, a capacity for diversification, pertains to matter. With respect to Thomas, the important consideration for the present undertaking is his recognition of the necessity of the situation: content must be assigned to prime matter. Not everything can be attributed to form. The entire realm of creatures, in so far as they are material, share in this content, whatever it may be, that must be assigned to prime matter. Thomas insists that unity pertains to a finite existent. The reciprocity manifested in the fact that the existent is this-matter-and-this-form would be meaningless were "matter" to signify a potentiality so nakedly uncharacterizable that nothing whatever could be said about it. For this and similar reasons, it has been contended that an implicit distinction must obtain between the notion of prime matter in some restricted sense and the notion assignable to the term in the absolute context where the relative incompetence of mind is at a maximum. Restricted prime matter is *functionally* absolute, perhaps, in a subordinate context of inquiry. It may be taken, for the purposes of science, *as if* absolute. But in the absolute context, where the total range of possibility must be at least acknowledged by the speculative intellect, the distinction between prime matter as limitable potentiality and as illimitable potentiality must be drawn.

Materia quantitate signata, if the expression stands for Thomas's final thought concerning the problem, is then the restricted prime matter of the world of things which science proposes to examine. Let us proceed to a further conjecture. Thomas, it seems reasonable to suppose, would assert that in this world some things imaginable are impossible. Doubtless that which genuinely involves a contradiction can not be, either in this world or in any other. It seems probable that Thomas, so curious a combination of saintly humility and incorrigible rationalism, would admit that, for all he knew, some other world is possible, and that in *that other world* things impossible for *this* world might be possible, while things possible for *this* world might be impossible for *that*. Now if "matter" were identical with nothingness, it is difficult to see how "matter" could have anything to do with determining what could or could not exist in this or in any world. But prime matter is not bare privation or nothingness. Presumably, then, it does have something to do with the possible and the impossible. If prime matter be quantitatively signate, something positive concerning its rôle seems indicated. (It must be noted that, since there are nonmaterial creatures, matter is not implicated in questions concerning the possibility of such beings.) Now the signateness of mat-

ter is maximal, it would seem, in the individual singular thing, in that which is a this-matter-and-this-form. It would appear that it approaches a minimum but nevertheless persists in the genus. ". . . the essences or quiddities of genera or species are individualized by the signate matter of this or that individual, although indeed the quiddity of a genus or species includes form and matter in general. . . ."[45] But then quiddity in some degree of attenuation, including form and matter in general, might well be posited throughout the hierarchy. If the expression be permissible, it could be said that a maximal attenuation of quiddity would involve a minimal signateness of matter: it would involve restricted prime matter at its maximal indetermination. Now it is notable that Thomas asserts that "the infinite of quantity is the infinite of matter." This statement ensues upon the following: "We must consider that a thing is called infinite because it is not finite; whereas matter is in a way made finite by the form, and the form by the matter. Matter is made finite by the form, inasmuch as matter, before it receives its form, is in a state of potentiality as regards many forms; but on receiving a form it is terminated by that one. Again, form is made finite by matter, inasmuch as form, considered in itself, is common to many; but, when received in matter, the form is determined to this one particular thing. Matter is perfected by the form by which it is made finite; therefore the infinite attributed to matter by itself contains the idea of something imperfect; for it is as it were formless matter. Form is not made perfect by matter, but rather is contracted by matter; and hence the infinite, regarded on the part of the form not determined by matter, contains the idea of something perfect. . . ."[46] Now if the infinite of quantity is the infinite of

[45] *SCG*, Bk. I, ch. 21; *E*, p. 52.

[46] *ST*, Q. VII, art. 1; *E*, p. 72. This text should be considered together with later passages of the same Q. ". . . Anything out of God can be accidentally infinite [*secundum quid*], but not absolutely infinite [*simpliciter*]. As regards the infinite applied to matter, it is manifest that everything actually existing possesses a form; thus its matter is determined by form. Because matter, considered as existing under some substantial form, remains in potentiality as regards many accidental forms; that is, it is simply finite [*E* here reads 'infinite,' but in the *L* it runs: *sed quia materia, secundum quod est sub una forma substantiale, remanet in potentia ad multas formas accidentales; quod est finitum simpliciter, potest esse infinitum secundum quid . . .*] yet it can be accidentally infinite; as, for example, wood is finite according to its own form, but still it is accidentally infinite, inasmuch as it is in a state of potentiality to an infinite number of shapes. If we speak of the infinite in reference to form, it is manifest that those things, the forms of which are in matter, are simply finite; and are in no way infinite. If any created forms are not received into matter, but are self-subsisting, as some think is the case with

matter; if it is the infinite that, as it were, expresses or constitutes the pervasive nature of matter; then the question might be raised: Is that "matter" whose infinite is the infinite of quantity the only possible "matter"? This question might be dismissed as merely speculative. But at any rate, in so far as matter signifies potentiality, then a matter whose infinite is the infinite of quantity is one that, by contracting whatever forms it *can* contract, whatever forms it *can* receive, will invariably yield entities having quantity, dimensive quantity, complete and definite quantity.[47] This material creation, say C_{mw}, is a world of things with respect to which quantity is constitutively basic. Of such a world this could be said: whatever a thing may be in its total nature, as a this-form-and-this-matter,—an apple, a star, a stone—it is minimally and basically something quantitative. It is something whose intelligibility involves specifications as to quantities, although this measure of intelligibility is far from exhaustive. Now if we take the position that human speculation can determine that there can be but *one* prime matter, and that the infinite of this matter is the infinite of quantity, then the distinction between restricted and absolute prime matter collapses. In effect, in this event, matter-possessing-the-infinite-of-quantity is absolute prime matter. In the language of Thomas, in mid-career, the indefinite dimensionality of matter prior to the reception of form would be the indefinite quantitative dimensionality of absolute prime matter. If, on the other hand, it be argued that speculation can not determine this, but must admit the possibility of other prime matters, it may nevertheless be said that, *for science*, matter-possessing-the-infinite-of-quantity defines the limit, in one direction, of scientific inquiry.

It is certain that Thomas envisages not-beings. Two alternatives appear. Thomas conceivably might be interpreted as follows: The not-beings known to God, the not-beings which are not, have not been, and will not be, are nevertheless not-beings that in some sense *could* exist in *that* world which, in fact, God did create (C_{mw}), and which is at hand for scientific inquiry. Of these not-beings, those that, if they did exist, would be unities of matter-and-form, would be contractions of a matter whose infinite

angels, these will be accidentally infinite; inasmuch as such kinds of form are not terminated, nor contracted by matter. Because a created form thus subsisting has being, but is not its own being; it follows that its being is received and contracted to a determinate nature. Hence it cannot be simply infinite" (Art. 2, *E*, pp. 73–74). The infinite in essence is to be distinguished from the infinite in magnitude; no natural body can be actually infinite; the infinite is not against the idea of magnitude in general, but is against the idea of any species of it (Art. 3, *E*, pp. 75–76).

[47] Cf. texts cited above, note 10.

is the infinite of quantity. In this sense, such not-beings would be compossible with the existences that are, that have been, or will be in this creation, C_{mw}. They would possess complete and definite quantity, were they to exist. If, now, on this supposition, it were asked: What reason can be assigned for this, that these not-beings are not? the reply, presumably, must rest upon the principle that "the order of things is the best possible: since the potency of the first agent does not fail the potentiality of things for perfection."[48] Thus it would be the case that the deity has not given existence to all compossibles (compossibles in the sense defined), for the reason that such existences would mean something less than the best possible ordering of things. (Scientific inquiry is here disinterested. Its faith, that there is an order of things, suffices—at least provided Descartes demonstrates that there is no malign genius holding sway over the domain of things to render nugatory the efforts of inquiry.) With respect to matter, on this alternative, it is necessary to posit only a prime matter whose infinite is that of quantity.

It is difficult to accept the preceding. Would not Thomas find in it an intolerable limitation ascribed by the finite intellect to the knowledge and will and power of the deity? The governing rule, the incommensurability of the finite intellect and the Divine Essence, would oppose such a limitation.[49] If this be acceptable, then, as an alternative—so runs the contention of this essay—it must be admitted as a speculative possibility that a distinction between restricted and absolute prime matter is becoming to the finite mind. The latter formula is functional in that it signifies the incomprehensibility of the divine knowledge, power, and will. It signifies the untrammeled divine creativity. On what grounds can we abolish the speculative validity of the conjecture that a creation could exist, such that, were there a universal science concerning its existents, quantitative concepts would *not* be basic for knowledge of them? An infinite "matter," whose infinite by hypothesis is not that of quantity, were it to contract appropriate forms capable of reciprocal causality with this matter, would yield existences, precipitates from an illimitable sea of possibility, material indeed but not in a sense imaginable by us. This is not to contend that there *are* other restricted prime matters. It is

[48] *SCG*, Bk. I, ch. 42; *E*, p. 88.

[49] Granted that we may know that God can not do what He has foreseen that He will not do, or omit to do what He has foreseen that He will do; that He can not do what He wills not to do, or omit to do what He wills: granted that according to Thomas we know this, it is not *thereby* known *what* He has foreseen that He *will* do, or what He *has* willed to do.

not contended that other created material worlds, C_{m_1}, C_{m_2} . . . are known by us to be possible. Rather, the contention is that we are not advantaged to the extent of being justified in a forthright denial of the possibilities. Moreover, it is contended that such considerations are in accord with the spirit, if not the very words, of the Thomistic system.

The metaphysical analysis of finite existence presented by Thomas represents a critical moment of intellectual history. It represents such a moment in many senses that can not be noted in this essay.[50] It may, or it may not, be true that Thomas foresaw the nature of that extraordinary enterprise, carried out with astounding efficiency, which we call modern science. It may, or it may not, be the case that the century of genius which defined the program of efficiency was aware of the significance of the Thomistic system in relation to that program. This metaphysical analysis, nevertheless, provided an opportunity for discerning the bases of the program.

Scientific inquiry confronts the world of things enjoyed by children and described by Aristotle. These things, according to the analysis of Thomas, are singular finite existents, each a case of this-matter-and-this-form. Such a thing is inexhaustible for human knowing. Science can but effect a series of approximations. Indeed, since a science of the singular in its singularity is for the deity alone, the closest approximations of science will be remote from the full reality of a natural thing. All the more will this be the case if the scientific enterprise be independent of theology, and if this enterprise should systematically neglect teleological ideas. Again, the multitude of diverse beings of this-matter-and-this-form falls within a unity of order. This order likewise may be approximated, faintly, by scientific inquiry. But no approximations of the singular existent can be satisfactory without approximations of the order and its unity. They must go together. An efficient program for inquiry must meet the need for economy imposed by the limitations of the human mind. The approximations must depend upon abstractions. But the abstractions must be grounded, somehow, in the nature of finite existence and its order.

[50] What follows, I beg the reader to understand, is recognized to be exceedingly partial. It is my conviction that Thomas's system provided the *auspices* for the emergence of modern science and its associated ideas. In another essay I am attempting to work this out with the necessary amplitude. For lack of space, in the ensuing pages I must neglect many factors, and be content with bare indications of their place.

The Thomistic analysis supplies a certain assurance. This is a world of things concerning which it can be said that the infinite of quantity is the infinite of its matter. The reciprocal causality of form and matter in the natural thing, i.e., the case of this-matter-and-this-form, implies an inter-adjustment and proportionality of the matter and form components. Through the form definite quantitative dimensionality arises from the quantitative potentialities signified by matter. Assuredly it must follow that the thing, the substance, the finite existent, has a certain internal organization expressed in and by the quantitative specifications pertaining to that thing. Now it is one thing to assert that the global nature of the natural entity is expressed by, is representable by, quantitative specifications; it is quite another to assert that this global nature is nothing but, nothing in addition to, such quantitative specifications. In the tight unity of the concrete being, so stoutly maintained by Thomas, however, a correlation, a harmony, must obtain between quantitative specifications and other aspects of its nature. In sum, then, a quantitative reckoning with all material things is suggested by the nature of these things. Moreover, the many things despite their diversities can be brought together under concepts and devices of pictorial representation reflecting this participation of things in the infinite of quantity. (One can not escape recollecting the famous text of Descartes: the infinitude of figures suffices to express the diversity of things. It is of the utmost importance to observe that the statement reads, *suffices* to *express;* it does not declare that diversity of things is nothing but a difference of figure.) Now all things fall within the unity of order. The materiality of these things can not be unrelated to the order, whatever it is, in its totality. To assert this would mean to veer towards the position that matter is non-being, mere privation, a nothingness. It would then appear that inquiry might attain laws, principles, ordering ideas of universal scope reflecting the community of matter and the fact that the infinite of quantity is the infinite of matter.

Let us hasten to add that, in terms of the Thomistic analysis, a science so delineated would combine precision and universality with preposterous inadequacy. It would be inadequate to the inexhaustible reality, the veritable this-ness, of a natural being, a dog, a stone, a star, a daffodil. Something of this reality, however, would be expressed and represented, along a line of radical abstraction. Moreover, such a science, achieving universal principle, would be remote from the splendor of that order which theology understands to be a divine plan, glimpsed, perhaps, by faith alone. But such a science, precise and universally relevant,

might well suffice for mundane practical purposes—for the purposes summarily described by Descartes in his ideal, that men should walk with security and dignity in this life.

Expostulation may be anticipated. Thomas did not assert that matter is a substance: but Descartes did. Let us turn to another work that commands respect. Maréchal,[51] granting that his interpretations are not misunderstood, urges that Duns Scotus can be viewed as the midpoint between Thomas and Descartes. In sum, he urges that for Scotus matter, without form, possesses entitative actuality. It is a positive entity. Scotus argues that between an actual entity and nothing there is no mean. Now for Thomas whatever is, is neither matter nor form but the unity of matter and form. Thus efficient causality refers to this unity alone, and the causality of matter is not efficient causality. The Scotist theory, asserts Maréchal, contains, at least in form, a denial of radical distinction between the reciprocal causality of matter and form, on the one hand, and passive and active causality on the other.[52] Thus a profound difference obtains between the Thomist and Scotist doctrines.[53] It would thus appear that, if Descartes drew upon historical resources in arriving at his own concept of matter and the use of the term "substance" in relation to it, these resources are Scotist rather than Thomistic.

This may be true, although it is certain that Descartes was a student of Thomas's writings—indeed, the ablest of all such students. The distance between Thomas and Descartes, however, is not so great as it may appear to be. Insufficient emphasis is customarily placed upon Descartes' own qualifications in the use of the term "substance." Properly speaking, the deity, the absolute in its *immensité,* God, alone is substance. There is an extraordinary shift in meaning, of which Descartes is fully aware, when the term is applied to anything-other-than-God. A finite substance is substance in that it depends solely upon God—the "concurrence" of God—for its existence. Beneath the use of words, however, lie ideas. Let us revert once more to Thomas. Matter does not exist. It does not have "entitative actuality." Since it does not have this, it can not have efficient causality. But analytically, all material things share in "matter." A restricted prime matter, *materia quantitate signata,* a matter whose infinite

[51] *Le point de départ de la métaphysique,* Paris, Alcan, pp. 88 ff.

[52] *Op. cit.,* pp. 85–86.

[53] The principle of divergence is said to be this: Scotus attributes an objective entitative correlate to every element of the internal structure of the concept; but for Thomas, as for Aristotle, only the totally determined objective concept represents a variety of beings. Pp. 90–91.

is the infinite of quantity, lies at the basis of actuality. If it receive a form, then with fatal certainty there will be a thing of quantitative dimensionalities. Science may take advantage of this. It would be preposterous to say that science comprehends the thing —but it knows something about it, something pertaining to its being, something permitting this thing to be brought together with that thing. The analytical formal factor constitutive of the being of this-matter-and-this-form can be expressed by, represented by, correlated with, the inescapably quantitative dimensionalities evoked in the material constitutive factor by the formal factor. It is a metaphysical absurdity to identify "green" and an electromagnetic wave of such and such frequency.[54] It is not absurd, on Thomistic grounds, to correlate one with the other. In a word, there is in the Thomistic analysis something truly anticipatory of the real significance of Descartes' matter-as-finite-substance. Science can treat things *as if* everything constitutive of a real entity can be reduced to and *sufficiently* represented by matter-quantities. Since science is limited, in its independent career, to the world of things with respect to which our cognitive powers are proportioned, it can treat this world *as if* it were the final referent of thought. It can treat the world of things, known to theology as creation, *as if* a scheme of matter-entities-in-motion were the only pattern of an existential science of things. Matter has no entitative actuality—let it be so. But restricted prime matter can be taken, for the sake of abstractions providing economy and efficiency in science, *as if* it were something within which quantitative specifications suffice to satisfy the limited aspirations of science and the needs of practical art. Appreciation of the full reality of Jones may be gained by means of social intercourse, and metaphysicians instructed by Thomas may insist upon ascribing it to Jones. But to a physician and a surgeon, as such, Jones must be a case, just one more patient. But is all this so remote from Descartes? There is a realm of indefinitude comprising an indefinitude of things. It indeed could not be save with the concur-

[54] This essay can not, for lack of space, consider questions concerning the relativity of sensed qualities to the percipient organism, or the subjective "psychical" status ascribed to sensation and perception. Modern dualism may involve a certain apportionment of the total reality assigned by Thomas to a natural entity. The duality of body and soul, once defined after the Cartesian fashion, may at once express the consequences of formulating the scientific procedural program and also facilitate its formulation. An elaborate system of correlations between that which is directly experienced and that which is defined as independently existing must be instituted. But these additional questions and factors, though pertinent, do not affect the argument of this essay.

rence of substance, of infinite being, of God. Science may construe this realm *as if* it were truly substantial, underived, self-supporting, and each of the indefinitude of "things" may be treated as if it were a mode or a set of modes in a "substance" having an inherent constitutive nature. This nature indeed lies at the basis of the several actualities, and conditions both their existence and their intelligibility. It may be the case that many properties, attributed by children and Aristotle to "things," do not really belong to things. If such is the case, an elaborate set of correlations must be established in order that science may reflect in its abstract quantitative reckoning with the thing as much as possible of the metaphysical entity, the this-matter-and-this-form. The reciprocal causality of matter-and-form becomes resolved into a system of abstract quantitative correlations, and restricted prime matter can be posited as the absolute for science. The career of metaphysical finite existents, which are severally cases of this-matter-and-this-form, may be resolved through efficient abstraction into particles obeying laws of motion. The blessed St. Thomas was well-advised. If the matter-component be a nothingness, there would be no economical way in which our limited cognitive powers could secure even slight mastery over the diversity of things, or attain by any approximation whatever notions comparable in scope with the vast indefinitude of a happily restricted prime matter. Prime matter does not exist. Prime matter has no entitative actuality. Let it be granted that these are metaphysical truths. They may be unknown to scientific inquiry. Or, what amounts to the same thing, they may be neglected by science, because they can be neglected. Since prime matter is not nothingness, it can be postulated *as if* it were the substance of the indefinitude of existence. There can be assigned to it, since its infinite is the infinite of quantity, whatever may facilitate its quantitative exploitation. Thereby we attain a form of scientific knowledge achieved by an astoundingly efficient program, with results, as Descartes foresaw, momentous for the security and dignity of man in this life. With results, not incredible, but incredible if science and metaphysics be simply identified.

Professor Koyré has neatly said of Descartes that he geometrized *à l'outrance*. Undoubtedly he did. It was scarcely avoidable, in view of the content he assigned to that prime matter which he proposed to employ as if it were genuinely substance. But all modern science has abstracted *à l'outrance*. It was an expedient required by efficiency. Provoked by a tension between metaphysics, which must sustain the inexhaustible singularity and undissipatable reality of concrete beings, and the practical necessities conditioning efficiency in inquiry, the expedient has

profound consequences for metaphysics. It is one thing to achieve a metaphysics anticipatory of science. It is another to achieve a metaphysics assimilative of the findings of science during centuries and recapturing the concreteness of existence while appraising the high abstractions of science. Whatever the terminology to be employed, the task is to recapture at a higher level that which the good St. Thomas insisted upon—that existents are this-matter-and-this-form. Somewhere Professor Gilson utters a remark to the effect that no one can be a Cartesian. This is true precisely in the sense in which it is true that no one can be an Aristotelian, a Platonist, a Thomist, or a Kantian. The saintly author of *Process and Reality* is certainly no Thomist. But he too must employ the notion of a prime matter, indeed, a restricted prime matter. Creativity is "the pure notion of the activity conditioned by the objective immortality of the actual world"; it is without a character of its own in exactly the same sense in which the Aristotelian "matter" is without a character of its own. It is significant, however, that the Whiteheadian prime matter is called "creativity." It may be that "ultimate notion of the highest generality at the base of actuality," but what it signifies must be distinguished from bare privation as the Angelic Doctor distinguished the prime matter of his analysis from bare privation. There are organisms not decomposable into subordinate organisms.[55] The temptation is irresistible. Might it be said: Creativity neither exists nor can be understood; what exists is organisms, of each of which it can be stated that it is a this-form-and-this-creativity, and each is a substance? The high abstractions of science must be made to converge upon and be absorbed within the concrete existent, organism. Whatever may be the value that history may come to place upon Whitehead's metaphysics, he has assuredly offered the general pattern for metaphysical effort that undertakes the task of reckoning with the results of science. Three centuries have elapsed since Descartes assured the scientist that figures, the supply of which is infinite, would suffice to represent the diversity of things. He who seeks to understand the body of scientific findings—and the doctrine of Whitehead—will agree that Descartes did not exaggerate the supply of mathematical essences that are available. Indeed, he will be relieved to know that the supply is infinite, since apparently all will be needed! He should be grateful if, perchance, some continuity of ideas reflecting persistent necessities can be discerned in the centuries since Thomas strove so mightily to prevent the collapse of prime matter into nothingness.

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[55] *Science and the Modern World*, p. 191.

DOES NATURALISM NEED ONTOLOGY?

IN writing my previous article [1]—to which Professor Hook has been good enough to reply [2]—my primary purpose was one of exploration. But one can not explore in these matters without a little preliminary probing. Some issues had to be raised in as sharp a form as possible. With the results in, the exploration can now proceed in the endeavor to see whether the two frames of reference are as opposed as Hook thinks they are. First of all, I shall seek to clear up some natural misunderstandings by elucidating my position on points he has queried. Then I shall undertake to suggest that he and Dewey are essentially right in what they affirm but wrong in what they deny or exclude. Perhaps I can best put my view in this way: For him it is a question of "either—or" while for me it is an affair of "both—and." It is for this reason that I do not regard epistemology and ontology as impedimenta. In spite of this I am in hearty sympathy with science and scientific method. But I do take what I regard as a justifiable pride in the technical endeavors of philosophy, holding that the results attained help to complete science at the theoretical level.

My general thesis was that materialism is naturalism *plus* or, to put it more precisely, is a specific form of naturalism. Hook and I are both naturalists and agree that it excludes cosmic purpose, a meaningful totality, and any variation of the Platonic form of the good. Whether or not this is *the* cultural issue, it is at least one of primary importance. I would also agree that materialism has been only one of the fighting forms of naturalism. To me, however, it has always been especially intriguing because it raised basic issues and also because its possibilities had been so much mishandled. It involved just those impedimenta which annoy Professor Hook; and it was my opinion that justice had not been done to its possibilities because technical philosophers had so long ignored it. I still maintain the thesis that a realistic epistemology is an essential preliminary to materialism. The development of an adequate materalism is, in my opinion, no easy affair, as will, I think, appear as we proceed.

"Matter" is both a scientific and a philosophic variable. I agree with Hook that a new theory of the constitution of matter is a starting-point for the refinement of materialism and not the basis for a refutation. We must also have clear ideas as to the reach and type of information about material systems attained by

[1] This JOURNAL, Vol. XLI (1944), pp. 533–544.
[2] This JOURNAL, Vol. XLI (1944), pp. 544–551.

the inorganic sciences. For example, the Cartesian assumption that extension exhausts all there is to material systems is to be guarded against. Much of the mystery of consciousness arises from the habit of assuming a too directly inspective and exhaustive conception of the reach and nature of scientific knowledge. But modern science is rather on its guard here. As I see it, many scientists take epistemology more seriously than does Professor Hook.

Of course, Hook is perfectly aware that I am not an illusionist with respect to the qualities of human experience. I have devoted much of my time to the mind-body problem and worked out a double-knowledge approach. As he rightly points out, therefore, it is a question of categorizing properly various mentionables and distinguishables in relation to material systems, such as the human organism. The critical materialist when he asserts bravely that "only matter exists" is denying a coördinate kind of existent. As an empiricist, he recognizes data of all sorts and attempts in his ontological theory to give them their correct status and locus of existence. Now it is my opinion that consciousness is intrinsic to the minded functioning of the organism. That is its existential status; and it must be categorized in accordance with it. Admittedly, it is no easy matter to do this. And much of past materialism failed in the attempt. My impression—which I tried to convey—is that an adequate materialism would reflect systematic analysis in epistemology and ontology, something which even scientific materialism has fallen short of. Such, as I see it, is the target at which to shoot. And I may mention here the fact that I use the expression "physical realism" not as something I have a patent on but as a shorthand term for a realism which is not of the medieval or Platonic type. In a recent conversation I had with Dr. Philipp Frank he remarked that, on the Continent, realism usually had this latter association and that was one reason why the logical positivists had somewhat ignored the American realistic movement.

Now I am quite ready to grant that Dewey and Hook are, in this comprehensive sense of the term, physical realists, and so not shut out from the haven of an organic materialism. I shall have more to say about likenesses and differences when I come to take up the second and third sections of Hook's exploratory reply. But, in the meantime, I must examine the prologue of criticism and suggestion.

"It is understandable," he writes, "that he [Sellars] wishes to exalt matter as a cause in order better to control its effects." Much depends upon what is meant by cause here. It must not imply

any externality of cause and effect. Certainly, one point I have always had in mind is the enlargement of the notion of what is intrinsic to an emergent physical system. In my first book, *Critical Realism,* one whole chapter was devoted to the topic, "Is Consciousness Alien to the Physical World?" This was, of course, an attack upon Cartesian dualism. I think we can locate the psychical as a *natural isolate* in the functioning organism and study its context and conditions. But, once more, the essential thing is to recognize that I denied only the separable and independent existence of sensory qualia. It is my impression that Dewey and Hook give these a status on the surface, so to speak, of things; while I put them within the minded organism.

I queried the remark that qualities and relations can be predicated of matter but not reduced to it. I did so because I believe that true predication must tell us something about what it is predicated of. Is this reduction? Rather is it the recognition that material systems are characterizable and not unknowable x's. Is this, as Hook suggests, an abuse of language? I do not see it. Of course, the form or shape of a molecule is not an entity along-side-of matter. It is something about the molecule which is distinguishable and knowable but, as Hook admits, is inseparable. How about organization? Of course, it is not another particle. It signifies the pattern of dynamic connection, or togetherness, of the particles. And here I am not an elementalist who believes only in aggregates. Surely, organization is not something immaterial even though it is not a particle.

While I queried some of Professor Hook's rather offhand remarks I am quite satisfied that we could find much that we could agree upon. I wished to probe and also thought he was a little cavalier in his treatment of materialism. He, on the other hand, was far more interested in naturalism than in the niceties of a sophisticated materialism.

The last point he makes in the first section puzzles me a bit. It concerns the status of consciousness and propositions. I had queried the existence of propositions apart from minded organisms. I had also stated that implications are not peculiar entities but facts about propositions with respect to one another. Now I do not see that such statements imply what Professor Hook apparently reads into them. I assuredly would not argue that consciousness is *identical,* or equatable, with the body. For me, here is a unique kind of part-whole relation or, better, of event-continuant relation which can only be categorized properly in the light of an adequate epistemological and ontological analysis. I have summarized this

in terms of the double-knowledge, emergence approach.[3] Certainly I never dreamed of maintaining that consciousness does not have the distinguishable qualia it evidently has. It was a question of locus and status. As for the defining marks of organisms, those used are connected with what I call external knowledge-about. The biologist worries little about the facts of consciousness and awareness, though, of course, he could not be a biologist without them. He is a specialist. But Hook goes on to claim that any one who recognizes that discourse about things is other than the things it is about must abandon the view that only matter, that is, material systems, exists. Yet if discourse—as he himself is inclined to admit—is inseparable from a discoursing organism, how does this follow? Even when I discourse about myself, my discourse is my organic self's activity.

I want to be irenic about this exploration. May I say that when Hook gave the most intelligible meaning to my statements he was always pretty close to my meaning? A competent materialist holds only that material systems have an existence which is *inclusive of* the existence of other empirical mentionables and distinguishables and that the need is for the assignment of proper status and the development of adequate categories.

But all this, while valuable in the way of exploration, points to the crucial importance of the next two sections. It is hardly needful to say that I formulated my theses in order to give a philosophical frame of reference. I could not assume that Hook would know what I was talking about unless I did something of this sort. I, of course, meant that these theses must be taken together to characterize reformed materialism as I understood it. Professor Hook's reading rather horrified me.

It is, I take it, clear that, like all pragmatists, Hook's perspective and emphases are founded on the assumption that it is impossible to escape from the epistemological trap set by Locke. This is the reason, I suppose, why he constantly belittles epistemological and ontological impedimenta. But, rightly or wrongly, I contend that epistemology and ontology are interconnected like Siamese twins and that philosophical tidiness—and I do not see why the philosopher should not want to do a neat job even if he is not that wonderful creature, a specialist in some science—demands their analytic clarification.

I have often held out an olive branch to pragmatists as fellow naturalists; and here is another one. In essentials it is a "both

[3] Perhaps my clearest treatments are in *The Philosophy of Physical Realism* and in the *Philosophical Review* (Vol. XLVII, 1938, pp. 461–487), in an article called "An Analytic Approach to the Mind-Body Problem."

—and" policy rather than an "either—or" one. I have never been a harsh critic of Dewey; I have always been appreciative of his remarkable achievements. But what I stood for was an enlargement of the pragmatic outlook. I am still allowing myself to hope that, as a younger man, Hook is a little less set, less dominated by old battles. He can have all the predictions he wants, though I hope he does not identify the verification of hypotheses about causal laws and chemical structures with vaticinations. And I am all for the control of human situations by means of applied knowledge. As a naturalistic humanist, I am completely sold on the proposition although I like a little of the sensitiveness of art and moral insight thrown in—and, by the way, that is all I had in mind with respect to my statement about science and the self.[4]

May I point out that Dewey has admitted that it would, perhaps, have been better terminologically if he had spoken about the *validation* of ideas and propositions in the reflective process? Here is where my "both—and" enters. I believe that all ideas should be validated and that it is by a process within experience, using all available data and methods, that the validation is achieved. That is why I reject any passive spectator theory of cognition. The new realism had more than a touch of it.

At the level of perception—which I distinguish from sensing or intuiting—I find the problematic and the need for characterizations which must be tested. And yet the *aim*, as I see it, is to denote and correctly to characterize things around our organic selves. This is an elementary level of cognition and we must use sensations as cues for interpretation. We are not always trying to do a scientific job at this stage and work out microscopic structure and laws. But we are trying to locate things as real as ourselves and to express facts about them. So you see I can agree with Hook's formula, "the existence of a problem to whose resolution knowing behavior is directed." But to me the problem often is that of the cognition of something over against the organic self. And I am not concerned with something "transcendent to which I can only point." No; I can handle them, eat them, cut them. They are things like myself for I am only my minded and conscious organism.

Increasingly I have come to feel that the percipient has been left out too much in discussions of perception. That is why I make the percipient, organic self so central in my theory of perception. I assume that Dewey and Hook would not disagree with this con-

[4] An article dealing with appraisal in terms of materialism appears in the current issue of *Ethics* (Vol. LV, 1944, pp. 28–45). I do not know whether science will ever completely catch up with the adventure or human living.

text. The technical problem is that of the specificity of this "cognitive mode of interaction" between the percipient organism and the selected thing. Now I hold that, in the perceptual experience with its meanings and distinctions, each one is on the inside of this cognitive mode of interaction. That is why I speak of reference, denotables, and the objective of an act of perception. I think that sensations are employed in perception to symbolize the thing the percipient is making the object of its cognitive mode of interaction. And validated concepts are added.

The point of all this is that I no more start with the Lockian assumption—connected with the old soul-physical-world dualism—than does Hook. The percipient is conscious that he is concerned with, and interpreting, the things around him. My questions are twofold: (1) Does Hook see any necessary conflict between problems and validation, on the one hand, and the achievement of the cognition of the things around us, on the other? (2) Are we not, as conscious, minded organisms, on the inside of this operation of selecting and interpretatively responding to the things around us? My point has always been that Dewey was too afraid of getting into the Lockian *impasse* if he acknowledged the personal locus of the perceptual experience. Certainly, the mind-consciousness-organism problem became a more subtle one. I take it that Charles Morris's treatment of the subject wherein he rejects the psychophysical view I outlined in my theses is pretty typical of pragmatism.

I have, in short, always recognized that, since the rise of realism, Dewey has been in intention a realist.[5] My thesis is that he worked to it as a biologist and made his adjustments in terms of the logic of inquiry; but that he did not fully see that a theory of perception could be worked out congruous with it and stressing responsive, interpretative aim. That is, again, why I say "both—and." Here, again, is my olive branch. I really don't think that I am as much on the periphery—to use Hook's kindly expression—as he thinks. And I hope this discussion will put him less on the periphery of my outlook. It is really pragmatism *plus*.

Now as to my term "disclosure." I adopted it to connect cognition with its mechanisms. I think we know what we are in "cognitive interaction" with *through* sensory symbols and concepts. Things appear in some degree in sensation and are disclosed in symbols and concepts. I give the term for what it is worth as casting light upon human cognition. Another expression is to say

[5] I believe I am justified in pointing out that I defended critical realism in this JOURNAL in 1908, *molti anni fa*.

that concepts enable us to know their exemplifications, that concepts are, intentionally, cases of knowledge.

There is at the base of the mechanism of human knowing an active reproduction of pattern. To some degree this appears in sensations but still more at the level of perception where we run our eyes over things and run our hands over them. That is why I thought that Hook's rejection of this reproduction of pattern in his book, *From Hegel to Marx,* by mere reference to the abstract principle of the general likeness of effect to cause is not specific enough. We are dealing with the human organism and its abilities.

To sum up this argument, it is time for the pragmatist to realize that his *clichés* are, in some measure, outmoded. From the very beginning of my intellectual career I thought in naturalistic terms. As far back as 1906 I was publishing along the lines of a double knowledge of the organic self. The difficult thing was to analyze perception to bring out its reflection of the pointing response of the organic self. Now Dewey really wants to do this. Hook's statements illustrate the fact. But, as I see it, Dewey was intimidated by traditional difficulties and took the path of process and validation *and let the cognitive claim and aim go largely by default.* That is why I say "both—and." I think this is a fair offer and should at least be seriously considered by Hook. Where there is so much smoke—criticism of Dewey's "either—or"—there is probably some fire.

One more point: the perennial thing-in-itself. I assert this Kantian concept does not apply to my epistemology because perceptual knowing is concerned with the things environing the organic percipient. The responsive reference is directed and direct; so is the characterization. Knowledge does not impinge on phenomena but on things in commerce with the organic knower. Dewey really agrees with this; but, as I said before, he got more interested in validation than in cognition. Now I am ready to give full leeway to prediction and action and to recognize that the verification of propositions usually involves new observations, though old observations, not used before for the purpose, can play the same logical rôle. But I still think that the scientist is interested in discovering perennial causal routines in nature, the structure of chemical substances, etc. I wonder if my outlook is a little clearer. Cognition, as I see it, thrives on the solution of problems. Satisfactory ideas, concepts, and propositions which disclose, or give knowledge, are achievements.

I come now to Hook's concluding remarks. It is evident that a materialistic naturalist bets on science as much as a pragmatic

naturalist does. I heartily endorse Hook's appeal to scientific method and his emphasis on the enlarging effect of scientific knowledge. There is no difference here between us.

Hook remarks that he thinks I overload the naturalistic approach with doctrinal impedimenta. My reply is that philosophy has a job to do and should not shirk it. Just to be a hanger-on of the various sciences with the courtier-like office of clapping hands is not enough. It is my conviction that a clarification of the nature of human knowing is a job which needs the coöperation of scientists and philosophers and which would help to complete science on the theoretical level. It might even throw light on the nature and reach of scientific knowledge. I believe that categories also need an exploration which is no easy one. But, with due qualifications, I would accept Hook's statement of the office of philosophy.

But Hook is grossly mistaken in his assumption that I would make philosophy a final arbiter over scientific facts. And I do not think that the question how human knowing is possible has either logical or temporal priority. It is a question which is unavoidable in the long run; but it is, itself, an empirical question. I think that epistemology deserves to be called a science. But my point in the quotation was that science could go ahead in its special investigations in the seventeenth century, but that philosophy had a cultural job to do which involved questions which the inorganic sciences of that time—and they were practically the only sciences then—could ignore. Cartesian dualism operated long as a *modus vivendi;* and so did positivism, phenomenalism, and Kantianism.

The rise of realism expressed the rejection of romantic idealism and a readiness to take the results of science at their face value. But—and here is my point—the task of interpreting the universe, being, existence, in a comprehensive fashion, in the light of the results, became all the more pressing. Where science and philosophy meet is, in my opinion, in the categories. This is a high theoretical level; and all the relevant clues in experience must be used. I quite agree with Hook on the critical procedure of philosophy. But I am convinced that the epistemological distinction between facts and existents, or what they are about, helps in this clarification of categories like substance or stuff, space, time, causality, etc. And, as a philosopher, I am ready to claim co-partnership with scientific specialists—there is no such person as a scientist-in-general—in trying to gain insight into these categorical distinctions. They can like it or lump it. And I do not think that the bigger scientists are unaware of the peculiarity of the problem of basic categories. Moreover, I would hold that the ex-

planation of the nature and conditions of human knowing helps to round out science, since all the sciences presuppose the fact of knowing. And the belief that any scientist can go ahead offhand and answer problems here is mere sycophancy which the able scientist does not admire. Logical positivism has exhibited specialists in science trying to be philosophers without much knowledge of the history of philosophy and obviously having to learn philosophy as they went along. They are progressing; and I am getting more hopeful of them.

Since Einstein has been brought in, I would remark that I, of course, accept relativity as a mensurational achievement essential to *physics*. And no philosopher can take Newtonian space and time seriously. In fact, my notion of space and time as characteristics of substantive being, so that, ontologically, time signifies activity and change, is simple and even Aristotelian, though the dynamism is more materialistic. But what the physicist wants to know is the quantities of where and when involved in any specific change; and he must have a frame of reference and mensurational devices for this important kind of knowledge. Lenzen, a good theorist in physics, has long seen that the dispute is that over positivism and realism and not over the relativity of measured wheres and whens. It interests me to note that Professor Hook is satisfied with operationalism. I take it that this sympathy is again connected with the process side, with the "either—or" of his outlook. I believe in operations as means to achieve knowledge about.

And so I conclude that epistemology and ontology are not impedimenta but ways of giving precision to the world-view growing out of science. And it is still my belief that a reformed, organic materialism is the direction it will take.

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COMMENTS AND CRITICISM

DO WE HAVE KNOWLEDGE-BY-ACQUAINTANCE OF THE SELF?

In a recent issue of this JOURNAL (Vol. XLI, 1944, p. 538), Professor Roy W. Sellars asked Professor Parker and me the question: "Do we have knowledge-by-acquaintance of the self?" It is no more than fair to answer such a question. Speaking for myself only, I reply: No: strictly there is no knowledge-by-acquaintance of anything. Although all direct experience (acquaintance) is experience of the self, that experience as such is not knowledge;

but the self consists entirely of what at some time is direct experience, and knowledge of the self is (epistemologically dualistic) knowledge of what is or was or will be direct experience.

A few points will amplify this answer.

(1) It is a first principle of idealism that direct experience is not knowledge. As Donald C. Williams, John Dewey, and idealists agree,[1] direct experience is "innocent," or "problematic." Only reflection (theoretical and practical) can interpret the further implications of the given, establish its status as self, and correlate evidence with reasoning in such wise as to produce knowledge.

(2) Referring to Professor Sellars' point 7 (p. 538), I agree that introspection is not necessarily self-awareness, although it sometimes is. Introspection may be directed toward the structure of an emotion, for example, without attention to the fact that it is *my* emotion. Self-awareness is a process of reflection on self (attention to self), and usually we are not reflecting on self when we introspect, any more than when we engage in external perception. The object reflected on is, at the moment of reflection (for epistemological dualists like Professor Sellars and me), not given, but referred to, although there is no reason why a datum once given may not become later an object of reflection. In my special terminology, the object of knowledge is not, at the moment of knowledge, a "situation experienced," but is a "situation believed in."[2] My agreement with Professor Sellars ceases at this point. In disagreement with him, I hold: (*a*) that every situation experienced is a self-experience (a unity of consciousness), whether or not reflective self-awareness be present; and (*b*) that the whole nature of a self is exhausted in actual and possible conscious experience.

(3) Reflection leads to the conclusion that the given is always a datum self. That is, it is a conscious experience, connected by memory and anticipation with past and future "datum selves," as well as being connected by causal interaction with its environment (see point 7 below).

(4) On my view the whole self is the "total experiencing" (to use Professor Sellars' phrase) of all conscious processes that are identified by actual or possible memory and anticipation linkages as belonging to one self. Thus the whole self is never given, but consists of constituents all of which are at some time given.

[1] See Donald C. Williams, "The Innocence of the Given," this JOURNAL, Vol. XXX (1933), pp. 617–628, and Edgar S. Brightman and Donald C. Williams, "The Self, Given and Implied—A Discussion," this JOURNAL, Vol. XXXI (1934), pp. 263–269.

[2] This terminology is explained in my *A Philosophy of Religion* (New York: Prentice-Hall, Inc., 1940), pp. 347–349.

(5) The physiological organism, on this view, is not the self nor any part of the self. It is, rather, a constant environment which causes and interacts with the self.

(6) Professor Sellars rightly avers that "materialism depends upon this identification of the self with the organism" (p. 539, point 14). But if this be true, the phrase "embodied self" (p. 537, point 1) is pure tautology, and means only "embodied body." "Embodied self" is a meaningful expression only if some distinction, such as I have suggested, be made between self and body. Such a distinction is also implied by epistemological dualism, for which the act of observing is a conscious experience not identical with the object observed. The self, then, is not its body or its objects, except that the self, in knowing itself, may become its own object; or, more exactly, one moment of the self may become object to another.

(7) The issue between us may be reduced to the formula: experience vs. causation. On my view, the self is what is directly experienced, although indirectly known. Knowledge of the self is a coherent account of those present, past, and future experiences which are unified into one self by the self-identifying experiences of memory, anticipation, and purpose. On Professor Sellars' view, as I understand it, the causes of immediate experience (especially the organism) are the self or are essential to it (I am not sure which wording he would approve). I object to this inclusion of the organism in the self—however useful it may be to psychology or physiology—for two reasons: (*a*) the unity of immediate experiences is a unique and knowable whole, in which are to be found all the data from which any further inferences about an organism or a world may be drawn; and (*b*) if one adopts the principle that the causes of a datum self (immediate experience) are a part of the self, it is difficult to see on what logical grounds one stops with the organism. If what causes X is a part of X, then, if we are thorough, every X is the entire universe. In this case, food, air, sunlight, and social environment are just as necessary causes of our experience as is the organism. If the causal principle be accepted as the key to the unity of the self, then each self is the universe, or at least everything in the universe which sustains the self. The opposed empirical principle appeals to the remembered and anticipated self-identification of consciousness, and provides a means of distinguishing the self from its environment. It is obvious that an idealism based on these principles will reject absolutism and will become a social personalism.

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BOOK NOTES

Justice and World Society. LAURENCE STAPLETON. Chapel Hill: The University of North Carolina Press. 1944. 150 pp. $2.00.

This book is a vigorous and healthy-minded defense of a revised natural law. The book is bipartite in emphasis. It criticizes the ethical scepticism of relativism and historicism, and it seeks to de-dogmatize natural law.

Choosing Vico, Buffon, and Herder as representative, Miss Stapleton isolates for critical treatment ideas which came to full philosophical expression in the nineteenth century and political exemplification in the twentieth century. Though the noxious effects of relativism are central in the discussion, the criticism of relativism is tied together with the criticism of the cluster of doctrines which have grown around it—the concept of struggle as a moral and social ideal, the concept of the variability of mankind which takes the place of the faith in the unity of mankind, the concept of the superiority of the group (state, nation, race) over the individual, the dethronement of reason as the characteristic mark of man and the usurpation of this position by doctrines emphasizing blood and feeling. Criticism centers upon the denials implicit and explicit in these ideas—the denial of the essential brotherhood of man, of the universality of justice as an ideal of government, of the intrinsic rationality of man independent of time, place, and culture, of the worth of the individual. What is thus negated by relativism and historicism is the enduring context of the law of nature. The legislative zeal of seventeenth- and eighteenth-century natural law with its hyper-rationalistic bias, its rigidity, and its apriorism provoked a reaction which destroyed what was good as well as what was dispensable in the doctrine.

Natural law doctrine emphasizes the reality, universality, rationality, and representativeness (consensual basis) of justice. Miss Stapleton adds to this family of traits that of variability. The introduction of such a category among these other characteristics necessarily has far-reaching consequences. Miss Stapleton takes some of the modifications into account in her treatment of these categories, but she fails, in this reviewer's opinion, to fully interpret the changes involved and is too much concerned with retaining old bottles for new wines. Despite passing criticism of utilitarianism and a few snide remarks about philosophies which take the categories of adaptation and growth seriously, her best insight runs along pretty well with the approach of realistic jurisprudence in law and instrumentalism in social and ethical theory. Yet while her essential insight is sound, the thoroughgoing exploration of it

is disappointingly missing. The enduring validity of natural law is "that it sets up a standard of justice against which the actual practice of a given legal system or form of government can be measured" (p. 12). This ultimately means, however, that the contents of justice are provisional; there are no contents which remain above criticism provided that content has empirical teeth. Justice is a moral variable and the significance of justice is methodological. Failure to follow through to this basic implication accounts for the doctrinal ambiguity of the latter parts of the book. Had the methodological perspective been more clearly envisaged, the nature of a standard would have received more attention. Failing to give this attention clouds the whole position. Her criticism of Del Vecchio and Stammler, her treatment of the relation of experience to justice, her interpretations of the functions of such value concepts as the brotherhood of man—are all weakened by her failure to see sufficiently clearly the teleological methodology of the idea of justice.

E. N. G.

Spinoza. Su vida. Su época. Su obra. Su influencia. Tomo III: *La obra de Baruj Spinoza.* LEON DUJOVNE. Buenos Aires: Instituto de Filosofía. 1943. 325 pp. $8 m/arg.

Leon Dujovne has conceived a series of four volumes on Spinoza. The first two, previously reviewed in this JOURNAL,[1] dealt respectively with his life and intellectual formation. The present or third volume offers a complete and faithful exposition along with a critical appraisal of Spinoza's theories. The coming or last volume is to concern itself with his influence.

The author throughout stresses the Spinozist vision of the "essential unity of all things," but at the same time points to the difficulties which beset the genial philosopher from Amsterdam in translating his irreplaceable vision into words. Some of the "most conspicuous deficiencies" of Spinoza's system are:

(1) In methodology, Spinoza believes that there is only *one* way of attaining knowledge, namely, by the self-evidence of reason. However, this "unity of method" is contradicted by the "duality" of reason and intuition in Spinoza's thought, so much so that some interpreters call his position rationalistic while others call it mystical.

(2) In metaphysics, which for Spinoza coincides with theology, his view of the divine has a "double sense," for in the first part of *Ethics* he is thinking of an impersonal God but in the fifth part of

[1] Vol. XXXIX (1942), p. 193; Vol. XL (1943), pp. 447–448.

a personal one. Moreover, if substance is characterized by an infinite number of attributes, what specifically are they other than matter and mind? Finally, his thesis of the "absolute parallelism of the attributes" fluctuates from a realist to an idealist interpretation, depending on whether matter or mind is made primary.

(3) In cosmology, Spinoza is faced with the logical problem of the one versus the many, for he is deeply convinced that reality is fundamentally one thing and yet includes many things. And in accordance with his ideas on attributes and modes, to everything physical there should correspond something spiritual. Do "inert" bodies, then, have "their" souls? An affirmative answer would lead to panpsychism. Nevertheless, some passages of the Spinozist work give the impression that only animals have sensibility and only man possesses reason.

Mr. Dujovne in a convincing and masterly fashion concludes that Spinoza's system has the defects of its qualities. No matter how objectionable these may be in the light of reflective thinking, one can not deny that the contradictions manifest in his philosophy can be shown to be apparent and hence be explained away by a careful consideration of his primary aim, which is, in effect, "to unify religion and science." In other words, if science and religion are inseparable, then there is no ultimate incompatibility between reason and intuition, Nature and God, determinism and freedom, etc. The *double* aspect of things saves Spinoza's philosophy from the charge of *duplicity* and perpetuates its greatness.

P. R.

BOOK REVIEW

Introduction to Mathematical Logic. Part I. ALONZO CHURCH. Notes by C. A. Truesdell. (Annals of Mathematics Studies, Number 13.) Princeton: Princeton University Press. London: Humphrey Milford, Oxford University Press. 1944. vi + 118 pp. $1.75.

Although there are now available in English several good elementary and advanced texts in mathematical logic, no text exists in the language which brings together in systematic form the fruits of syntactical and semantical researches during the past thirty years. The present monograph goes a considerable way to satisfy the need for such a book, and gives the English reader something of the perspective upon recent work which the well-known Hilbert-Ackermann text achieves in German. It contains the substance of approximately the first half of an introductory course in mathe-

matical logic which Professor Church offered in 1943 to graduate students in mathematics, and is in fact a revision of lecture notes prepared by one member of that class. The first chapter is devoted to the propositional calculus and includes, in addition to more familiar material, full discussions of the consistency and completeness of this branch of formal logic. The second and third chapters develop the first order (or "lower") functional calculus. The list of topics which receive careful discussion contains the rule of substitution, the deduction theorem, the consistency of the calculus, the Gödel completeness theorem, the Löwenheim-Skolem theorem on the satisfiability of formulas of the system in denumerably infinite domains, and the decision problem. The final chapter is concerned with functional calculi of higher order. It briefly surveys, among other things, the present state of research concerning the theory of types, the consistency of these calculi, and the axioms of infinity and of choice. The monograph will undoubtedly prove to be useful to students and teachers of the subject; they will certainly hope that the second part of the course will soon be made available to them. On the other hand, the booklet is not for beginners, and Professor Church rightly notes that it is "not recommended as an introductory text-book for students who do not have some substantial mathematical background."

E. N.

OTHER NEW BOOKS AND JOURNALS

Patrick, Rembert W.: Jefferson Davis and His Cabinet. Baton Rouge: Louisiana State University Press. 1944. x + 401 pp. $3.75.

Hynd, J. Hutton: The Creative Task of Rational Religion. A Memorial Tribute to Dr. Stanton Coit (1857–1944). St. Louis, Mo.: Ethical Society of Saint Louis. 1944. 24 pp.

We have reveived the following reprints:

"The Incentives of Science" by C. Judson Herrick from *The Scientific Monthly*, Vol. LVIII (1944), pp. 462–466.

"Plotinus Enneads 2.2" by Philip Merlan from *Transactions of the American Philological Association*, Vol. LXXIV (1943), pp. 179–191.

"Our Belief in Reason" by William K. Frankena from *Papers of the Michigan Academy of Science, Arts, and Letters*, Vol. XXIX (1943), pp. 571–586.

"Some Suggestions for Implementing a Cooperative Philosophy of Education" by Joseph L. Blau from *Harvard Educational Review*, Vol. 14 (1944), pp. 221–231.